Chapter 2 - The Alternatives

Introduction

This chapter describes the differences between the alternatives considered for revision of the 1983 Plan. The revision includes changing all, or a portion of, the programmatic decisions that make up the plan. This chapter provides the following four discussions:

1. Development of the alternatives.
2. Description of each alternative.
3. Alternatives considered but eliminated from detailed study.
4. Comparison of the alternatives. Included in this discussion is a summary of the alternative effects described in Chapter 3.

Development of the Alternatives

Chapter 1 discussed the need for change leading to this Revised Plan. This idea is key to alternative formulation. Some parts of the Revised Plan are the same in all alternatives and include:

- Existing and approved ski areas.
- Existing developed recreation sites, utility corridors, and electronic sites.
- Continued emphasis on dispersed rather than developed recreation.
- Existing wilderness designations.
- Fish Creek municipal watershed.
- 63.5 miles of eligible wild or scenic river to be protected until a finding of suitability is made (in all but the no-action alternative).

Potential major changes to the 1983 Plan are identified as revision topics/significant issues. After identifying the revision topics, the interdisciplinary team did the following:

- Analyzed how well the 1983 Plan currently responds to each revision topic.
- Developed a set of options for addressing each revision topic.
- Combined the options for addressing each revision topic into preliminary alternatives representing a wide range of possibilities for managing the Forest in the future.
- Identified other needed changes not related directly to revision topics.

Preliminary alternatives were first displayed in the Analysis of the Management Situation (AMS) in June 1993 and the Notice of Intent, published in July 1993. The alternatives were refined and presented to the public at a series of open houses in September 1993. Public comments were received regarding the range and number of alternatives and possible duplication. After further analysis and review, some alternatives were changed. The major change was the addition of two new alternatives developed from public comment and the deletion of three alternatives that appeared to be repetitious. All alternatives were designed to be fully implementable and achievable.

The revised alternatives were displayed in the Draft Environmental Impact Statement (DEIS) published in February 1996. Public comments on those alternatives can be reviewed in Appendix K. Alternatives shown in this Final Environmental Impact Statement (FEIS) are very similar to those in the DEIS, with appropriate modifications in response to public comments.

Important Points Concerning all of the Alternatives

Alternatives differ from each other in the extent to which they respond to revision topics. The alternatives address changes to each component of the 1983 Plan: goals and objectives, standards and guidelines, management area prescription allocations, monitoring and evaluation, allowable sale quantity, oil and gas leasing availability, recommendations for new wilderness, identification of eligible wild and scenic rivers, and potential research natural areas.

All alternatives (including the current management or no action alternative) use new management area prescription numbers to be consistent with other forests in this region and surrounding regions. All alternatives meet the management requirements of 36 CFR 219.27, as well as all other legal and regulatory requirements. All alternatives also meet the intent of the goals established in the Rocky Mountain Regional Guide.

Because activities, outcomes, and effects are sensitive to budget, each alternative has been analyzed at two different budget levels. The full implementation, or desired condition, level has a budget that is relatively unconstrained and reflects the desired level of implementation. The experienced budget level analyzes activities, outcomes, and effects with a budget that is constrained to current, experienced levels.

The Selected Alternative

The Regional Forester for the Rocky Mountain Region has identified Alternative C as the selected alternative in this FEIS. The Regional Forester's official decision and rationale for that decision are contained in the Record of Decision (ROD) which accompanies this document.

Description of each Alternative

For consistency with other forests within the Rocky Mountain Region and surrounding regions, all alternatives (including Alternative A, the no action alternative,) are described and mapped using new management area prescriptions. Prescriptions are grouped in categories which have similar management characteristics.

Categories range from little human-caused alteration to the Forest (Category 1) to substantial human-caused change (Category 8). Each alternative allocates land to management area prescriptions at various levels within the categories. For a more complete description of categories and management area prescriptions, see Chapter 2 of the Revised Plan. Table 2-1 describes the categories.

Table 2-1. Management Area Prescription Categories

Category	Description	Example
Category 1	Preservation lands with very little human influence	Wilderness areas
Category 2	Conservation lands that represent rare ecosystems	RNAs
Category 3	Areas with limited use but more human activities allowed	Motorized backcountry areas
Category 4	Recreation areas	Scenery, dispersed recreation
Category 5	Forested ecosystems providing timber and range products	General forest and rangelands
Category 7	Forest Service land adjacent to private land	
Category 8	Ski areas and utility corridors	

Table 2-2 shows the comparison of management area prescriptions used in the 1983 Plan and the new management area prescriptions considered for use in alternatives examined in this FEIS. Some of these management area prescriptions are not used in the selected alternative.

Table 2-2. Management Area Prescriptions

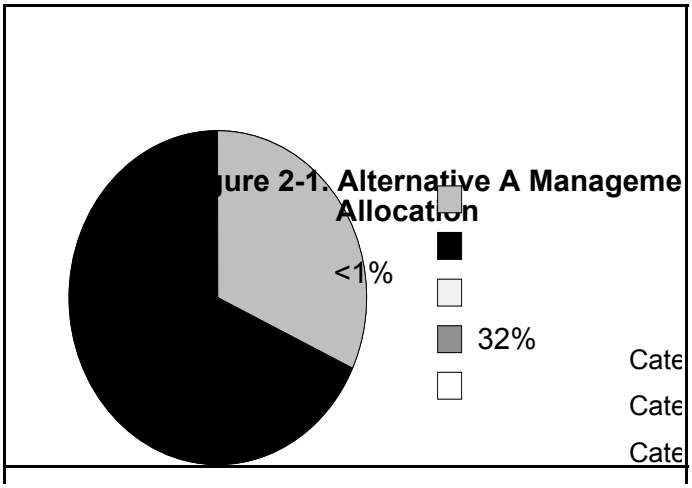
	New Management Area Prescriptions	Management Areas in the 1983 Plan
1.11	Wilderness, Pristine	8A
1.12	Wilderness, Primitive	8B
1.13	Wilderness, Semi-Primitive	8C
1.2	Areas Recommended for Wilderness	3B
1.32	Backcountry Recreation - Nonmotorized	3B & Some 3A
1.41	Core Areas	New
1.5	National River System - Wild Rivers	New
2.1	Special Interest Areas	10C
2.2	Research Natural Areas	10A
3.21	Limited Use	New
3.23	Municipal Watersheds	10E
3.31	Backcountry Recreation - Motorized	2A & Some 3A
3.4	National River System - Scenic Rivers	New
3.55	Corridors	New
4.2	Scenery	New
4.3	Dispersed Recreation	2B
5.11	General Forest and Rangelands - Forest Vegetation Emphasis	4B
5.12	General Forest and Rangelands - Range Vegetation Emphasis	6B
5.13	Forest Products	7C, 7D, 7E, 9B
5.21	Water Yield	9B
5.41	Deer and Elk Winter Range	5A & 5B
7.1	Residential/Forest Interface	New
8.22	Ski-Based Resorts: Existing/Potential	1B
8.3	Utility Corridors and Electronic Sites	1D

Alternative A

Alternative A is an updated no-action alternative. Under this alternative, current management of the 1983 Plan would continue for the next 10 years. This alternative is updated to include new technology, management area prescriptions, and standards and guidelines. The 1983 Plan projected an Allowable Sale Quantity (ASQ) of 390 million board-feet (MMBF) for 1991- 2000. However, Alternative A has a revised ASQ based on updated suitable timberlands, FORPLAN model analysis, yield tables, silvicultural practices, new management area prescriptions, costs, and revenues.

This alternative does not recommend more wilderness. It protects some backcountry areas, provides a wide range of recreation opportunities, and reflects current levels of volume offered.

Figure 2-1 shows the allocation of management area prescriptions grouped into categories. Sixty percent of the Forest is allocated to Category 5. Category 1 makes up 32%. Under this alternative, acres in Category 2 make up such a small percentage of the total (0.04%) that they do not appear on the chart.



Relationship To Revision Topics

Biological Diversity - Insect and disease outbreaks and wildfires are controlled. Vegetation changes are generally initiated by humans. One RNA of 600 acres is proposed, but has not been designated.

Roadless Areas/Wilderness - Approximately 19% of the Forest is managed as designated wilderness. No additional wilderness designations are recommended. Twelve percent of the Forest is managed for dispersed backcountry recreation and maintenance of roadless character. Vegetation is influenced primarily by natural disturbances.

Timber Suitability/ASQ - There are 421,335 acres suited (scheduled and unscheduled) for timber production. The ASQ for the first decade is 230 MMBF.

Recreation/Travel Management - Semi-primitive recreation opportunities are emphasized. Summer nonmotorized recreation opportunities are emphasized on 33% of the Forest, while 49% of the Forest emphasizes motorized recreation. The remaining 18% would emphasize management activities with few opportunities for recreation.

Wild and Scenic Rivers - No additional eligible wild and scenic river candidates are identified. Portions of the Elk and Encampment Rivers, totaling 48.5 miles, are recommended for wild and/or scenic river designation and given interim protection pending Congressional action.

Alternative B

This alternative was developed in response to the roadless revision topic and in part to biological diversity issues of old growth and mature forests. It protects all roadless areas in backcountry management area prescriptions, recommends several areas for wilderness, and provides a high level of nonmotorized recreation opportunities.

Lands identified for timber are in a general forest allocation. Compared to Alternative A, Alternative B has a lower ASQ, more proposed RNAs, more potential wild and scenic rivers, and more backcountry allocations.

As shown in Figure 2-2, 49% of the Forest is allocated to Category 1 emphasizing natural processes. Active management (Category 5) takes place on 27% of the Forest.

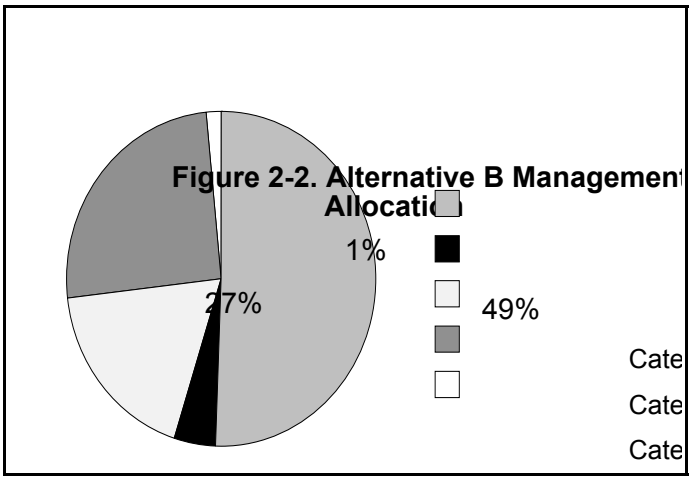


Figure 2-2. Alternative B Management Allocation

Relationship To Revision Topics

Biological Diversity - Insect and disease outbreaks and wildfires are generally allowed to shape vegetation composition and structure. Five proposed RNAs, totaling 70,100 acres, are identified.

Roadless Areas/Wilderness - Approximately 19% of the Forest is managed as designated wilderness with an additional 10% recommended for wilderness designation. In addition to wilderness acres, 22% of the Forest is managed for dispersed backcountry recreation and maintenance of roadless character. Vegetation is influenced primarily by natural disturbances.

Timber Suitability/ASQ - There are 244,397 acres suited (scheduled and unscheduled) for timber production. The ASQ for the first decade is 94 MMBF.

Recreation/Travel Management - The mix of summer Recreation Opportunity Spectrum (ROS) classes features nonmotorized recreation opportunities on 52% of the Forest and motorized opportunities on designated roads and trails on 48%. Some collector roads are closed to public motorized use or are minimally maintained to discourage use.

Wild and Scenic Rivers - All eligible wild and scenic river candidates, totaling 63.5 miles, are given interim protection until a suitability study is conducted. This includes portions of the following rivers: Elk, Encampment, North Platte, Rock Creek, Red Canyon, and Roaring Fork.

Alternative C (Selected Alternative)

This alternative was developed in response to the revision topics and the concern that the focus of forest management maintains emphasis on multiple-resource objectives. Many of the programs under this alternative are similar to those in the 1983 Plan, however this alternative allocates more acres to backcountry recreation.

The resource production level is lower than in Alternative A because more timber harvest lands are in the general forest allocation rather than the intensive timber management allocation. This alternative provides motorized and nonmotorized opportunities similar to those in Alternative A and has more potential wild and scenic rivers. Three RNAs are designated under this alternative.

As shown in Figure 2-3, 46% of the Forest is in active management in Category 5. Forty-one percent is in Category 1.

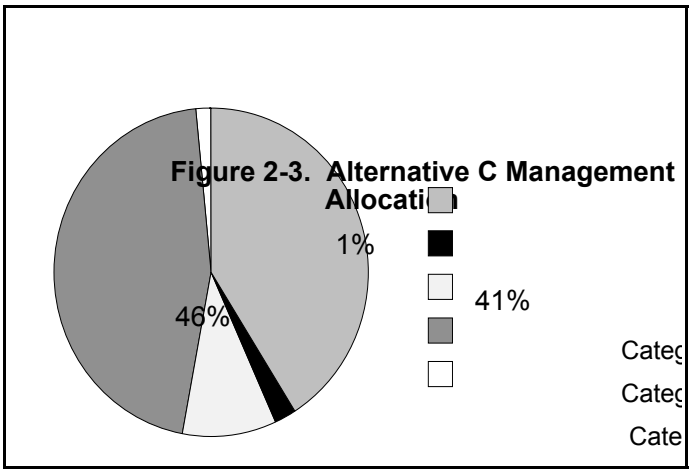


Figure 2-3. Alternative C Management Allocation

Relationship To Revision Topics

Biological Diversity - Insect and disease outbreaks and wildfires are generally allowed to shape vegetation composition and structure in backcountry areas. Three proposed RNAs, totaling 31,400 acres, are identified.

Roadless Areas/Wilderness - Approximately 19% of the Forest is managed as designated wilderness. No additional wilderness designations are recommended. An additional 22% of the Forest is managed for dispersed backcountry recreation and maintenance of roadless character. Vegetation is influenced primarily by natural disturbances.

Timber Suitability/ASQ - There are 357,821 acres suited (scheduled and unscheduled) for timber production. The ASQ for the first decade is 148 MMBF.

Recreation/Travel Management - There would be a mix of open and closed roads, with a continued emphasis on semi-primitive recreation opportunities. Summer nonmotorized recreation is featured on 46% of the Forest, while 41% of the Forest offers motorized opportunities on designated roads and trails. Thirteen percent would emphasize management activities with few opportunities for recreation.

Wild and Scenic Rivers - Same as Alternative B.

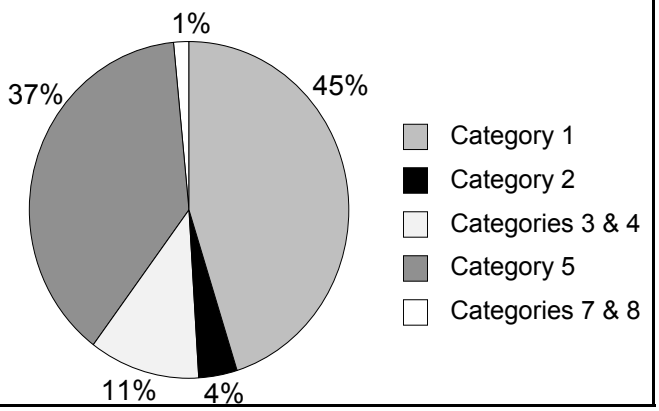
Alternative D

This alternative responds to the revision topics by creating backcountry areas and a small amount of recommended wilderness, providing for timber production, and maintaining biological diversity. It emphasizes protection of roadless areas, with intensive management for timber on lands that have been logged in the past.

Compared to Alternative A, Alternative D has more roadless areas, a lower ASQ, more proposed RNAs and more potential wild and scenic rivers.

Figure 2-4 shows the similarity with Alternative C. Forty-five percent is in Category 1 which emphasizes natural processes. Thirty-seven percent of the Forest is in active management in Category 5.

Figure 2-4. Alternative D Management Category Allocation



Relationship To Revision Topics

Biological Diversity - Insect and disease outbreaks and wildfires are generally allowed to shape vegetation composition and structure in backcountry areas. In more intensively managed areas, insect and disease outbreaks and fire are controlled, as appropriate, to meet the objectives of the area. Vegetation changes are generally initiated by humans. Five proposed RNAs, totaling 70,100 acres, are identified.

Roadless Areas/Wilderness - Approximately 19% of the Forest is managed as designated wilderness with an additional 2% recommended for wilderness designation. In addition to wilderness acres, 27% of the Forest is managed for dispersed backcountry recreation and maintenance of roadless character. Vegetation is influenced primarily by natural disturbances.

Timber Suitability/ASQ - There are 296,009 acres suited (scheduled and unscheduled) for timber production. The ASQ for the first decade is 171 MMBF.

Recreation/Travel Management - Summer nonmotorized recreation is featured on 48% of the Forest while 35% of the Forest offers motorized recreation on designated roads and trails. Activities not related to recreation would be featured on 16% of the Forest.

Wild and Scenic Rivers - Same as Alternative B.

Alternative E

This alternative was developed in response to the motorized recreation and timber revision topics and in response to concerns about economic stability of communities in and around the Routt National Forest. Compared to Alternative A, Alternative E has fewer backcountry recreation acres, a higher level of timber production, more proposed RNAs, and more potential wild and scenic rivers.

This alternative emphasizes timber and resource production while incorporating principles of ecosystem management.

The emphasis in this alternative (as shown in Figure 2-5) is on active management, with 64% of the Forest in Category 5. Natural processes (Category 1) are emphasized on 25% of the Forest.

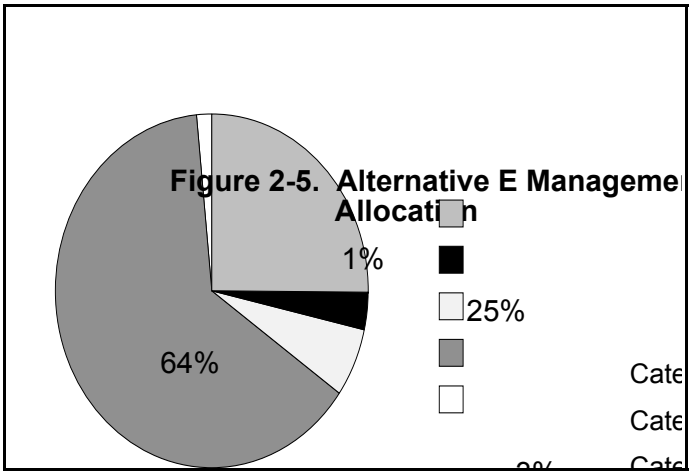


Figure 2-5. Alternative E Manageme Allocati n

Relationship To Revision Topics

Biological Diversity - Insect and disease outbreaks and fire are generally controlled. Vegetation changes are usually the result of human-caused activities, such as timber harvest and grazing. Five proposed RNAs, totaling 70,100 acres, are identified.

Roadless Areas/Wilderness - Approximately 19% of the Forest is managed as designated wilderness. No additional wilderness designations are recommended. In this alternative, 6% of the Forest is managed for dispersed backcountry recreation and maintenance of roadless character. Vegetation is influenced primarily by natural disturbances.

Timber Suitability/ASQ - There are 421,008 acres suited (scheduled and unscheduled) for timber production. The ASQ for the first decade is 260 MMBF.

Recreation/Travel Management - Summer nonmotorized recreation is featured on 29% of the Forest, while motorized opportunities are offered on 49% of the Forest on designated roads and trails. Management activities unrelated to recreation would be featured on the remaining 22%.

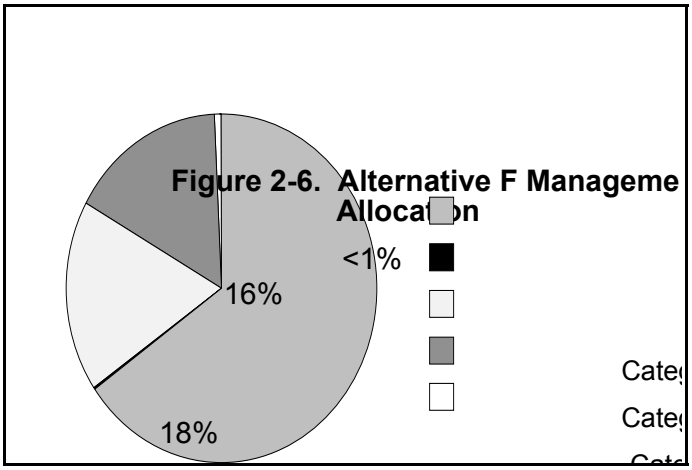
Wild and Scenic Rivers - Same as Alternative B.

Alternative F

This alternative was developed from comments submitted by a group of local residents working with the Colorado Environmental Coalition. The alternative is framed around the concept of island biogeography. The group feels this is the best way to perpetuate biological diversity. There is less emphasis on programs such as recreation and timber management. Recreation would be allowed. However, if a resource conflict affecting biological diversity occurs, the conflict would be resolved in favor of biological diversity. Timber production occurs on a small scale in areas allocated to the general forest management area prescription.

This alternative preserves large tracts of land in a series of core reserve allocations and recommended wilderness areas. Compared to Alternative A, this alternative has more recommended wilderness, proposed RNAs, and potential wild and scenic rivers. It has less timber production, grazing, and oil and gas activity than Alternative A.

Figure 2-6 shows the emphasis on preservation, with 83% of the Forest in Categories 1, 3, and 4. The allocation in Category 5 is 16%. Under this alternative, Category 2 makes up such a small percentage of the total (0.2%) that it is scarcely visible on the chart



Relationship To Revision Topics

Biological Diversity - Insect and disease outbreaks and wildfires are generally allowed to shape vegetation composition and structure. Six proposed RNAs, totaling 71,600 acres, are identified.

Roadless/Wilderness - Approximately 19% of the Forest is managed as designated wilderness with an additional 25% of the Forest recommended for wilderness designation. In addition to wilderness acres, 20% of the Forest is managed as core areas with an emphasis on biological diversity in the inventoried roadless areas. Vegetation is influenced primarily by natural disturbances.

Timber Suitability/ASQ - There are 160,200 acres suited (scheduled and unscheduled) for timber production. The ASQ for the first decade is 49 MMBF.

Recreation/Travel Management - Summer nonmotorized recreation opportunities are featured on 67% of the Forest. Some existing arterial and collector roads would be closed to public motorized use. About 33% of the Forest offers motorized opportunities on designated roads and trails.

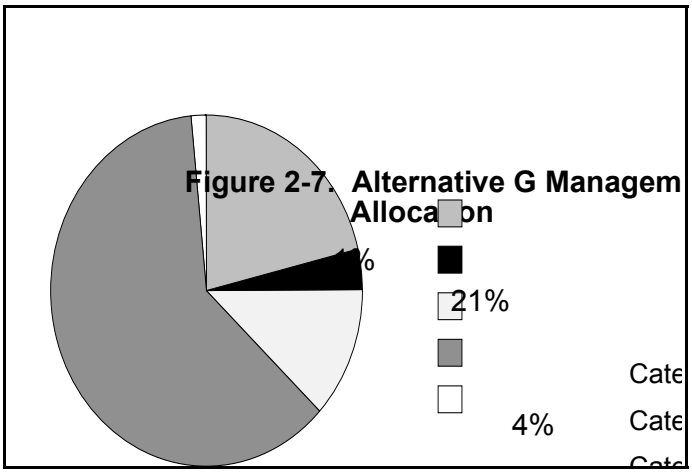
Wild and Scenic Rivers - Same as Alternative B.

Alternative G

This alternative was developed from comments submitted by the Jackson County Multiple Use Coalition. It was developed to address the concern that multiple-use emphasis be the focus of forest management and to provide for motorized recreation, timber production, and other uses of the Forest.

This alternative emphasizes a multiple-use concept to maintain or improve the economy and quality of life for local residents. This alternative is similar to Alternative A in timber production, however, it has less acres in backcountry allocations and more land in the general forest allocation.

The emphasis in this alternative is on active management, with 62% of the Forest allocated to Category 5 (see Figure 2-7). Twenty-one percent of the Forest is in Category 1, with a preservation emphasis.



Relationship To Revision Topics

Biological Diversity - Insect and disease outbreaks and fire are generally controlled. Vegetation changes are generally initiated by human-caused activities, such as timber harvest and grazing. Five RNAs, totaling 70,100 acres, are identified.

Roadless Areas/Wilderness - Approximately 19% of the Forest is managed as designated wilderness. No additional wilderness designations are recommended. In addition to wilderness acres, 4% of the Forest is managed for dispersed backcountry recreation and maintenance of roadless character.

Timber Suitability/ASQ - There are 436,300 acres suited (scheduled and unscheduled) for timber production. The ASQ for the first decade is 226 MMBF.

Recreation/Travel Management - Summer nonmotorized recreational opportunities are featured on 25% of the Forest, while 54% of the Forest offers motorized opportunities on designated roads and trails. Management activities with few recreation opportunities would be emphasized on the remaining 21%.

Wild and Scenic Rivers - Same as Alternative B.

Conformance with the Resource Planning Act (RPA)

The National Forest Management Act (NFMA) regulations require the development of at least one alternative which incorporates the national and regional resource objectives from the Resource Planning Act (RPA) Program and the amended Rocky Mountain Regional Guide. The RPA established a comprehensive national framework for forest planning through 1997. It provides long-term strategy and program emphasis rather than dictating specific, quantified outputs. As a result, no resource objectives were quantified for each region to give to individual forests. The RPA Program is updated every 5 years and has 3 components:

1. Forest Service roles in natural resource management.
2. Forest Service program responses to contemporary issues.
3. Long-term strategy to guide the program development and budget processes.

It emphasizes four high priority themes:

1. Recreation, wildlife, and fisheries resource enhancement.
2. Environmentally acceptable commodity production.
3. Improved scientific knowledge about natural resources.
4. Response to global resource issues.

This guidance was used in the Amended Rocky Mountain Regional Guide to shape National Forest System, research, and state and private forestry programs. This process is considered in the revision. All alternatives incorporate the four high-priority themes.

Conformance with Research Natural Area Direction

In November of 1993, the Regional Forester issued direction to evaluate and consider recommendation of areas for inclusion into the Research Natural Area (RNA) system during forest plan revisions. The Regional Forester also stated that forests in revisions could accomplish the RNA evaluation and establishment process via future forest plan amendments. The Forest has identified three areas to be considered for RNA designation in the Revised Plan. For a complete description of these areas, see the RNA section in Chapter 3 and Appendix F.

Alternatives Considered but Eliminated from Detailed Study

Several alternatives were considered and eliminated from further detailed study during the planning process. Not every identified alternative can be fully considered. For example, alternatives which are only slightly different from other alternatives were eliminated from further detailed consideration. Alternatives eliminated from detailed study are the 1983 Plan as the No Action Alternative described below and four additional alternatives identified on page 15.

1983 Plan as the No Action Alternative:

The NFMA regulations state that "At least one alternative shall reflect the current levels of goods and services provided by the unit and the most likely goods and services expected to be provided in the future if the current management direction continues. Pursuant to NEPA procedures, this alternative shall be deemed the 'no action' alternative" [36 CFR 219.12(f)(7)].

As the Forest entered into revision, it was assumed that the 1983 Plan would be updated and displayed as the no action alternative. The updated 1983 Plan would reflect changes such as Congressional action to designate additional wilderness or wild and scenic rivers. Inventory updates required by statutory or regulatory authority, such as determination of lands suitable for timber production and roadless area inventory, would be included.

As the 1983 Plan was analyzed, it became clear that significant changes had occurred, primarily in the timber management area. The following presents a summary of that analysis and explains why the 1983 Plan was not a viable alternative and was eliminated from further study.

Timber Suitability

NFMA regulations 36 CFR 219.14(d) require that "designation in the plan of lands not suited for timber production shall be reviewed at least every 10 years" and that "such lands may be reviewed and redesignated as suited for timber production due to changed conditions at any time." To comply with this regulation and respond to the timber revision issue, the suitable timber land base had to be analyzed, and a new FORPLAN model to determine ASQ had to be built. ASQ is based on the suitable timber land base, yield tables, economics, and standards and guidelines.

There are five initial standards used to determine whether a particular parcel is tentatively suitable for timber production. Those lands which remain suitable after applying the five standards are termed Tentatively Suitable Timber Lands (TSTL). The five criteria are:

1. Is the land forested? [36 CFR 219.19 (A) (1)]
2. Is the land withdrawn from timber production? [36 CFR 219.13 (A)(4)]
3. Is the land producing commercially usable timber? (FSH 2409.13-21.3)
4. Is irreversible resource damage likely to occur? [36 CFR 219.14 (A)(2)]
5. Is there reasonable assurance of adequate restocking within 5 years after final harvest? [36 CFR 219.14(A)(3)]

When these five criteria were applied, tentatively suitable timber lands decreased by 9,300 acres compared to the 1983 Plan. Most of the difference occurred in lands determined to have irreversible soil or watershed damage or lands where regeneration was not assured in 5 years. The 1983 Plan did not identify any acres in these two categories.

The next step in determining timber suitability was to identify lands where timber production was not appropriate. Areas with other resource uses precluding timber production were identified. This included riparian areas and unique habitat. In addition, areas with physical barriers to timber harvest (extremely rocky or wet soils) were excluded from the suitable base. The resulting lands are tentatively suitable and common to all alternatives. When these criteria were applied, tentatively suitable lands common to all alternatives decreased by an additional 89,500 acres compared to the 1983 Plan. This resulted in a total decrease of 98,800 acres.

The difference in timber suitability analysis is attributed to improved resource data and technology, including the completion of a soil survey and the use of a GIS. Several layers of resource data were compiled in GIS for the suitability analysis. GIS was then used to perform the suitability analysis. For instance, soils were used to identify areas where there is inadequate response information (the areas produce less than 20 cubic feet per acre per year) and areas with physical barriers preventing timber harvest. Slopes and geologic hazards were used to identify areas where irreversible soil or watershed damage might occur. Areas where regeneration was not assured in 5 years were identified through the use of elevation, aspect, and plant association. For a complete discussion of the timber suitability analysis, see Appendix B.

Change to Modeling Allowable Sale Quantity

To estimate ASQ, a FORPLAN model was built using the latest modeling available, FORPLAN Version 2. The model used for the 1983 Plan was FORPLAN Version 1. There are many differences between the two versions. In addition, the following four components of the model were updated:

Suitable Timberlands - As explained above, the tentatively suitable timber lands were analyzed and updated.

Yield Tables - The yield tables for the 1983 Plan were constructed with two separate growth and yield models. R-2GROW was used to model the existing stands and RMYLD modeled the regenerated stands. R-2GROW is a diameter class simulation model and RMYLD is a whole stand, distance-independent model. These models are limited in simulating complex stand structures.

The yield tables for the Revised Plan have been constructed with the Central Rockies Variant of the Forest Vegetation Simulation (FVS) growth and yield model. This is an individual tree, distance-independent model. This improves the modeling of complex stand structures since no standard distribution of sizes is assumed. This type of model has the capability to simulate growth of uneven-aged or multi-aged stands, as well as mixed species stands. There is also greater flexibility in specifying management options as individual trees can be identified for removal.

Costs and Revenues - All costs of timber management have been updated to reflect the current costs and to implement standards and guidelines. In addition, the 1983 model did not consider the cost of entering roadless areas or areas without rights-of-way or access. The updated model takes these specific costs into account. Revenues have been updated to reflect the last 4-year average returns from timber sales.

Modeling Standards and Guidelines - The modeling of standards and guidelines improved under FORPLAN Version 2. The 1983 model did not constrain the amount of acres harvested to meet visual quality objectives or watershed constraints. These resource constraints limit the timber harvest when implementing the forest plan. The improved modeling capability under Version 2 made it possible to include these constraints.

In addition, standards and guidelines have been updated for the new management area prescriptions. This has changed the use of certain silvicultural practices not implemented under the 1983 Plan. For instance, the water yield management area prescription in the 1983 Plan used clearcutting in spruce/fir stands. This silvicultural practice is not applied to spruce/fir, so it was changed to a shelterwood system in the standards and guidelines for the Revised Plan.

The updated standards and guidelines have also changed the mixture of silvicultural practices to allow for uneven-aged management in lodgepole pine. In addition, only those areas where timber will be managed to meet timber production goals (management area prescriptions 5.11, 5.13, and 5.21) will be considered suitable for timber and contribute toward the ASQ.

The discussion above demonstrates the many changes in the FORPLAN model, yield tables, data, standards and guidelines, and lands suitable for timber harvest that have occurred since the 1983 Plan. This results in a better simulation of timber management activities. These changes would result in an annual ASQ level similar to those projected by Alternative A, approximately 23 MMBF. This represents a 41% decrease from the 39 MMBF per year projected by the 1983 Plan.

Because the 1983 ASQ level is not achievable due to the changes discussed, the 1983 Plan cannot be implemented. For this reason, the original 1983 Plan is not being further evaluated and is not considered in detail in this analysis.

Alternative A was designed to approximate the 1983 Plan using the changes described above. In this sense, Alternative A serves as an "updated" 1983 Plan that is responsive to present-day technology, conditions, public issues, and management concerns. It is analyzed and considered in detail as the no action alternative.

Other Alternatives

The AMS displayed an alternative which would modify existing direction to ensure the stability of the local wood fiber industry, contribute towards national wood fiber demands, and offer increased motorized recreation opportunities. This alternative was eliminated from detailed study because both Alternatives E and G meet these objectives.

The AMS included an alternative similar to Alternative C, except that it would assure an above-cost timber sale program. This alternative was eliminated from detailed study because the cost of the timber sale program is evaluated in all alternatives and Alternative A already contains an above-cost timber sale program.

The AMS displayed an alternative which would manage the Forest at three different levels of intensity. This alternative was eliminated because it closely resembles Alternative D.

An alternative to maximize water yield was considered. It closely resembles Alternative E and so was dropped from further consideration.

Comparison of the Alternatives Considered in Detail

This section is designed to help the reader understand and compare the land allocations, activities and outputs, and effects of the seven alternatives. The alternatives are compared in tabular form in the supplemental tables immediately following this chapter. The comparisons in Tables S-1, S-2, and S-3 are grouped into the three categories (land allocations, activities and outcomes, and budget levels) summarized below. The seven alternatives are also compared in terms of their effects on the environment under the section Summary of Effects by Alternative beginning on page 16 and continuing through the remainder of this chapter.

Summary of Key Land Allocations

Each alternative makes decisions on various land designations. These land designations include management area prescriptions, timber suitability, minerals management, travel opportunities, and management of roadless areas. Table S-1 (directly following this chapter) lists the acres of land allocated to various prescriptions and activities under each alternative.

Summary of Two Budget Levels

Land allocations (Table S-1) are not usually sensitive to budget levels. However, outputs and environmental effects (Table S-2) are related to the amount of funding the Forest receives. Because of the sensitivity to budget, alternatives were analyzed at two different budget levels. The full implementation, or desired condition, budget level is relatively unconstrained and reflects the desired level of plan implementation. The experienced budget level is constrained to reflect current allocated budget levels. The actual constraint is based on a 3-year average of funds allocated to the Forest for fiscal years 1992, 1993, and 1994. For the experienced budget level, funding for each program area was adjusted to meet the theme of each alternative.

Table S-3 displays the budget levels for each program area under the seven alternatives. The base year of 1994 is included in this table for comparison purposes. It should be noted that the

base year funds are often at a higher level than the experienced level for all alternatives. This is because the base year reflects the Forest expenditures in 1994, which were at a higher level than the 3-year average allocation (the experienced budget level constraint).

Summary of Projected Activities and Outcomes

Each alternative estimates levels of activities and corresponding outcomes or outputs. Table S-2 displays the estimated activities, outputs, and effects for each alternative. The desired condition level reflects the full implementation budget level for decade 1. Activities and outcomes at the experienced budget level are displayed for decades 1 and 5.

Summary of Effects by Alternative

This section summarizes the more detailed information found in Chapter 3. The major environmental effects of each alternative are presented, by topic, in the order in which they appear in Chapter 3. Some topics are not discussed in this section. For a full disclosure of all environmental effects, please consult the relevant section in Chapter 3.

Air

None of the alternatives considered would substantially change existing air quality on the Forest. There are no significant differences in effects to air quality among the alternatives.

Use of motorized vehicles, particularly on unpaved surfaces, produces vehicle emissions and dust, which are temporary and localized effects. Differences among alternatives would be slight, but would be less in Alternative F because more roads would be closed. The potential for air quality degradation would be greatest under Alternative G because it projects the greatest amount of motorized use.

Prescribed burning and wildfires can also affect air quality. The potential for air quality impacts from burning is greatest in Alternatives B and F.

Soils

The potential impacts to the soils resource result from the level of management activity and the effect of the activity on soil productivity. The alternatives are ranked based on potential risk to soils, from greatest risk to least: Alternatives E, A, G, D, C, B, and F. The relative ranking of the alternatives is based on the information found in Table 3-4 - Summary of Acres Disturbed and Erosional Index by Alternatives and Table 3-6 - Primary Activities Affecting Soils.

Water

Potential effects to watershed are the result of past, current, and future timber management and are based on the amount of timber and number of connected disturbed areas. Implementation of Alternative E, followed by Alternatives A, G, D, C, B, and F, would have the greatest potential for adverse effects to the water resource.

Using soil and water improvements to minimize connected disturbed areas can reduce the potential for adverse watershed effects. The use of Best Management Practices (BMPs) and implementation of the direction in the Watershed Conservation Practice Handbook (WCP) will reduce potential for adverse effects. Implementation of BMPs; monitoring their effectiveness; and adherence to WCP laws, regulations, and guidelines should protect watershed health.

Biological Diversity

Biological diversity is the full variety of life in an area along with the processes which maintain it. In response to growing concern over loss of habitats and ecosystems and species extinction, biological diversity was identified as a revision topic. A three-part approach to the biological diversity analysis was used:

1. The range of natural variability addresses the Forest's historical development and past condition.
2. The coarse filter focuses on the function, composition, and structure of ecosystems.
3. The fine filter addresses those few species whose needs were not covered adequately in the coarse filter analysis, due to unique habitat requirements or rarity of species numbers in an area. The more restrictive habitat needs of these fine filter species will serve as an indicator of overall biodiversity for the Forest. Accordingly, the fine filter portion will be the primary focus used to assess effects of the alternatives on biodiversity.

The biological assessment and evaluation for threatened, endangered, and sensitive species (fine filter) concluded that any of the proposed alternatives may adversely impact individuals. However, none of the alternatives would cause a loss of viability for any of the analyzed species at the Forest, Section, or Province levels or cause Forest species currently listed as sensitive to trend towards federal listing.

Fire

Three wildland fire control strategies will be used: direct control, perimeter control, and prescriptions control. The control strategy to be used varies with the management area prescription allocation. Table 2-3 shows the percentage of the forest, based on management area allocations, where the different control strategies will be used.

Table 2-3. Wildland Fire Control Strategies by Alternative (percent)

	Alternatives						
Control Strategy	A	B	C	D	E	F	G
Prescription or Perimeter	34	62	44	52	29	82	28
Perimeter or Direct	63	29	47	39	64	17	63
Prescription, Perimeter, or Direct	3	9	9	9	7	1	9

Source: GIS (ARC/Info), management area prescription allocation layers

As the forest ages, fuel loads increase and so does the fire hazard. Fuel loads will increase under all alternatives. It will increase to smaller degree in those alternatives with more timber harvest activities. The risk of ignition from lightening will remain constant under all alternatives. The risk of human-caused fires will increase under alternatives due to a projected increase in forest visitor use. In alternatives with less motorized access, the risk of large fires will increase due to an increase in fire crew response time.

Fisheries and Aquatic Habitat

The criteria used to evaluate the seven alternatives and determine their impact on fisheries and aquatic habitat (relative risk ranking) include miles of proposed roads, estimated number of stream crossings, watersheds entered, acres proposed for harvest, and the erosion potential of acres proposed for treatment. Alternatives E, A, and G propose higher levels of management activities and would have more impact than Alternatives F and B which propose lower management activity levels. The risks of adverse effects would be greatly reduced with proper mitigation measures, including BMPs and implementation of standards and guidelines designed to protect aquatic habitat under all of the proposed alternatives.

Insects and Disease

Control of insects and disease is directly related to timber harvest activities. Alternatives with the highest levels of vegetation management and most acres of suitable timber will have the lowest potential for large-scale insect and disease outbreaks.

Alternatives G, E, A, D, and C do the most for creating healthier stands of timber and for creating greater diversity of age and size classes of timber. Alternatives B and F do the least for integrated pest management. Table 2-4 displays the acres harvested for timber in decade 1 for the experienced budget level.

Table 2-4. Acres of Timber Harvest by Alternative for Decade 1

ALT A	ALT B	ALT C	ALT D	ALT E	ALT F	ALT G
12,940	8,930	11,260	11,560	13,140	5,200	13,400

Source: Routt FORPLAN model

Vegetation

The largest factors influencing vegetation on the Forest will be timber harvesting, livestock grazing, and natural disturbance levels. The term "natural disturbance" used here includes fire, insects, and disease. The levels of activities associated with each of these factors varies with each alternative.

Alternative G would affect the most acres by timber harvest, followed by E, A, D, C, B, and F. Alternative C would harvest about 0.8% of the Forest in the first decade at the experienced budget level.

Livestock grazing will also influence vegetation. Most alternatives allow livestock grazing on 84% to 91% of the Forest, subject to forest-wide standards and guidelines. However, Alternative F allows grazing on 55% of the Forest and Alternative C allows grazing on 86%.

Natural disturbances and their effects are a necessary component of ecosystems. The degree to which these natural disturbances are allowed to operate will influence vegetation over time. The alternatives are ranked F, B, D, C, A, E, and G, from most to least, in terms of the amount of area where major natural disturbance events could be allowed.

Wildlife

The impact of the proposed alternatives on wildlife was evaluated in three sub-sections:

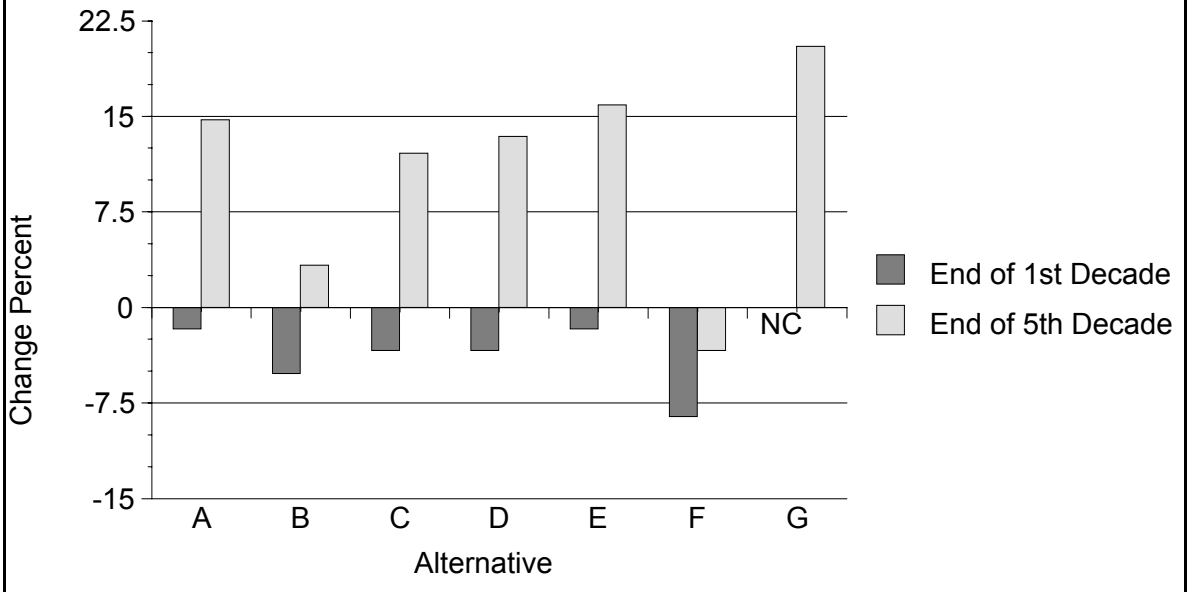
- Wildlife habitats.
- Wildlife disturbance and displacement.
- Recreation opportunity (hunting).

All of the proposed alternatives would provide the habitat composition, structure, and function to support viable populations of native, as well as desired, nonnative vertebrate species for the short (10 years) and long term (50 years). Habitat composition and structure varies between alternatives. For example, Alternatives F and B would slightly accelerate the current trend towards an older forest, with a higher percentage of mature conifer and aspen stands favoring wildlife species associated with these habitats. Alternatives A, E, and G would tend to benefit species associated with earlier seral stages of vegetation. Alternatives C and D, over time, would not significantly favor species associated with any one vegetative successional stage, but would more closely replicate the current composition and structure of forest wildlife habitats.

Alternatives A, E, and G propose higher levels of management activities requiring road construction and would result in higher road densities, the greatest reductions of habitat effectiveness, and the highest risks of impacting big game hunting season security areas and ultimately hunting quality and opportunity.

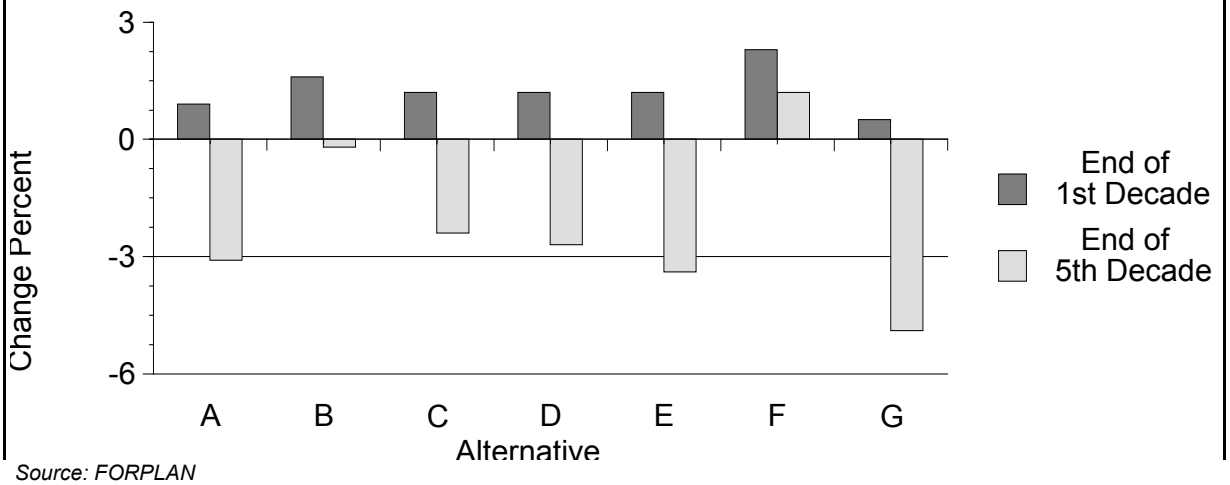
Figures 2-8 and 2-9 show the projected changes in forestwide road density and forestwide habitat effectiveness between alternatives for the short-term.

Figure 2-8. Projected Percentage Change in Open Road Density Forestwide, by Alternative, Short-term and Long-term (Experienced Budget Level)



Current Open Road Density: 0.58

Figure 2-9. Projected Percentage Change in Forestwide Elk Habitat Effectiveness by Alternative, Short-term and Long-term (Experienced Budget Level)



Source: FORPLAN

Source: FORPLAN

Recreation

The Forest currently provides recreation opportunities for a variety of visitors, including those from Denver and surrounding communities, residents from rural communities adjacent to the Forest, and the international market of downhill skiers at the Steamboat Springs Ski Area. There is a conflict between these user groups as to what opportunities should be provided and how much of the Forest should be allocated for motorized or nonmotorized use.

The Recreation Opportunity Spectrum (ROS) is used to compare opportunities and the allocation of resources associated with each alternative.

The Forest will continue to:

- Manage developed recreation facilities with emphasis on reconstruction and improvements to meet the requirements of the Architectural Barriers Act of 1968 and the Americans with Disabilities Act of 1990.

- Administer the recreation special-use permit for the Steamboat Ski Area and the proposed Catamount Ski Area.

Alternative B provides a recreation emphasis, with opportunity to meet all program objectives within a constrained budget. Alternatives C and D would emphasize semi-primitive recreation opportunities facilitated by the use of partners (outfitters, guides, concessionaires, trails groups), information, and interpretation. Alternatives A, E, and G emphasize a semi-primitive motorized recreation program. Most opportunities would be the outcome of access provided by other management activities. Alternative F emphasizes wilderness opportunities, with very little emphasis on recreation (see Table 2-5).

Table 2-5 shows the ROS class emphasis and the change in money spent on capitol improvements and investments (+ indicating more spent, - indicating less, and 0 indicating no change) for the seven alternatives.

Table 2-5. Acres of ROS Classes by Alternative (in thousands of acres)

	Alternative						
ROS Class	**A**	**B**	**C**	**D**	**E**	**F**	**G**
Primitive	245.1	256.5	264.8	259.0	251.2	266.2	207.5
Semi-Primitive Nonmotorized	199.0	442.9	358.1	398.2	145.6	642.0	137.8
Semi-Primitive Motorized	505.6	520.1	412.0	359.2	556.6	393.4	590.1
Roaded Natural	146.5	116.1	132.0	106.4	92.5	42.8	130.8
Roaded Modified	248.2	0	177.7	221.5	298.4	0	278.3
Rural	13.6	13.6	13.6	13.6	13.6	13.6	13.6
Urban	.441	.441	.441	.441	.441	.441	.441

Source: GIS (ARC/Info), management area prescription allocation and ROS layers

Travel Management

The greatest influence on travel management (roads and trails) is the allocation of lands to different management area prescriptions. Lands allocated to management area prescriptions 1.2 (recommended wilderness), 1.32 (backcountry recreation, nonmotorized), and 1.41 (core areas) would have the greatest effect by reducing the total miles of usable roads on the system, increasing the miles of road obliteration needed, and increasing the total miles of trails on the system. This would occur mostly in Alternative F.

Roads allocated to the management area prescriptions mentioned above would be either obliterated or adopted as trails, particularly in wilderness. All other alternatives would be similar to each other and to the present condition.

Refer to the S tables located at the end of this chapter to compare alternatives for effects to the road and trail system.

Table 2-6. Miles of Annual Road Construction and Reconstruction and Obliteration by Alternative - Desired Condition Level.

Roads	**A**	**B**	**C**	**D**	**E**	**F**	**G**
Construction	25.6	11.1	16.5	17.1	27.9	5.0	24.7
Reconstruction	11.8	8.5	9.9	10.0	12.5	1.3	11.7
Obliteration	20.0	20.0	20.0	20.0	20.0	40.0	20.0

Source: FORPLAN and Routt Forest staff

Research Natural Areas

Research Natural Areas (RNAs) are selected to preserve a spectrum of relatively pristine areas representing a wide range of natural variability within natural ecosystems and environments and areas that have special or unique characteristics of scientific importance.

RNAs represent a range of vegetation types and topographic features that have not been heavily influenced by humans. Timber harvest is prohibited in these areas, and there are some restrictions to livestock grazing. Recreation use is allowed with few restrictions. The RNAs on the Routt National Forest, in combination with other RNAs in the Region, ensure that research and education opportunities will be available in the future across a wide range of ecosystems.

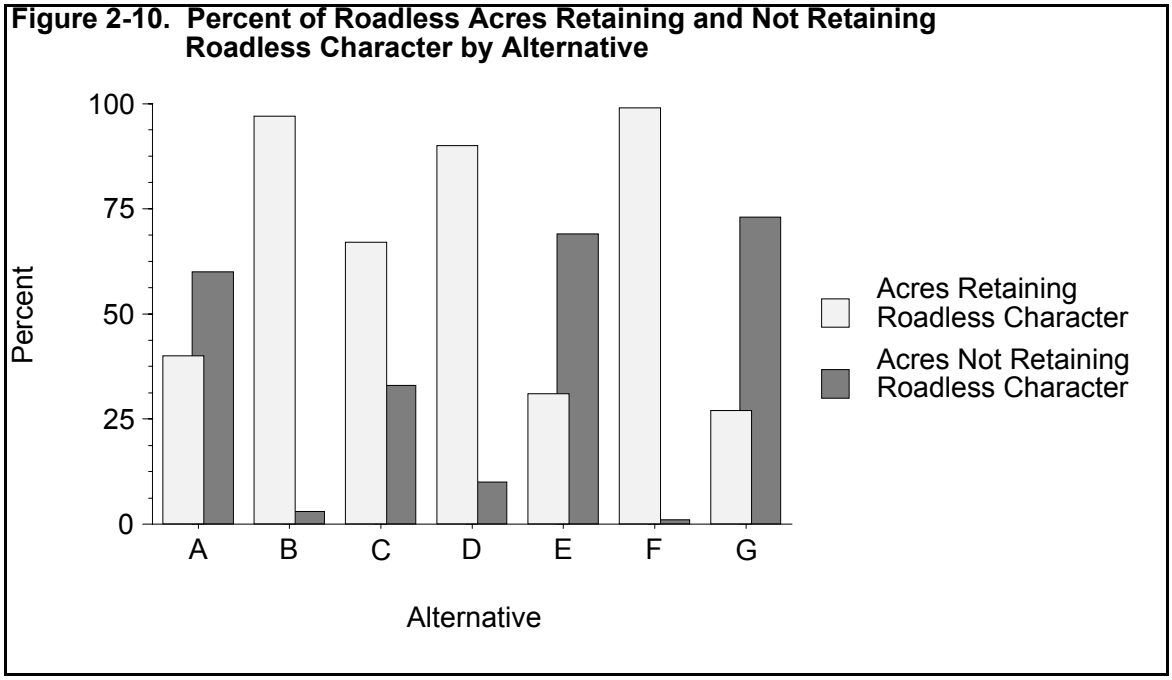
Alternative F proposes six RNAs totalling 71,600 acres. Alternatives B, D, E, and G each have five proposed RNAs totalling 70,100 acres. Alternative C has three proposed RNAs with a total acreage of 31,400. Alternative A has one proposed RNA of 600 acres.

Roadless Areas/Wilderness

The Forest currently has 32 roadless areas totalling 502,245 acres. Each of these areas was evaluated for potential wilderness designation based on capability for wilderness, availability for wilderness, and the need for additional wilderness. The assessment to determine the need for additional wilderness found that additional acreage was not necessary at this time. However, Alternatives B, D, and F did propose additional wilderness acreage.

Under some alternatives, the roadless areas will generally retain roadless characteristics. Under other alternatives, the roadless characteristics will not be retained. Figure 2-10 shows the percentage of total roadless acreage, by alternative, which retains roadless character and that which does not.

Figure 2-10. Percent of Roadless Acres Retaining and Not Retaining Roadless Character by Alternative



Source: GIS (ARC/Info), management area prescription allocation and roadless inventory layers

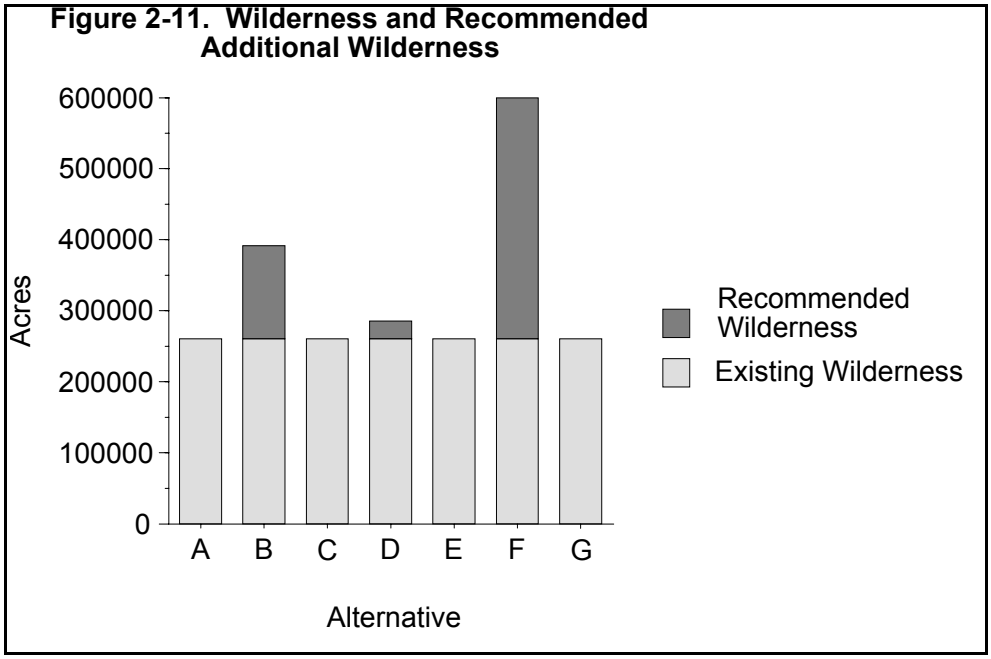
Wild and Scenic Rivers

In all alternatives, 48.5 miles of rivers are recommended for inclusion in the National Wild and Scenic River System. In Alternatives B, C, D, E, F, and G, an additional 15 miles are found eligible and protected pending a suitability study.

Wilderness

The Routt National Forest contains 265,119 acres (19.6%) of existing wilderness. An additional 502,245 acres are roadless. Alternatives B, D, and F recommend additional wilderness. Figure 2-11 illustrates the differences in acres, by alternative, for existing wilderness and recommended wilderness. Existing wilderness is the same (265,119 acres) for all the alternatives.

Figure 2-11. Wilderness and Recommended Additional Wilderness



Source: Wilderness acres from various Wilderness Acts, recommended wilderness acres from GIS (ARC/Info), management area prescription allocation layer

Minerals

Minerals are divided into two categories, locatable and leasable. Locatable minerals are referred to as hardrock minerals and include gold, silver, iron, and copper. Leasable minerals include fossils fuels, geothermal resources, phosphates, etc.

Locatable minerals are affected by an area's potential for discovery of the mineral and by those management area prescriptions which withdraw areas from entry. Alternative F withdraws the

largest percentage of the Forest from entry for locatable mineral entry, followed by alternatives B, and D. Alternatives A, C, E, and G withdraw the least.

Leasable minerals are impacted by the extent of the acreage available for leasing. Under the Federal On-shore Oil and Gas Leasing Reform Act of 1987, the Forest is required to determine availability of lands for leasing. The leasing analysis, completed in 1993, opened 606,500 acres with high-to-moderate potential for oil and gas production. Specific information can be found in the Oil and Gas Leasing Analysis Environmental Impact Statement, 1993. An additional 190,500 acres of low potential land are analyzed in this document. The remainder of the nonwilderness lands (approximately 361,000 acres) have no known potential for oil and gas production. A site-specific analysis would be required to issue a lease on these lands that have not been analyzed.

Alternatives A, C, E, and G have the most acreage available for leasing; Alternatives D and B have lesser amounts. Alternative F has the least. Supplemental Table S-1 displays the acres by leasing stipulation for each alternative.

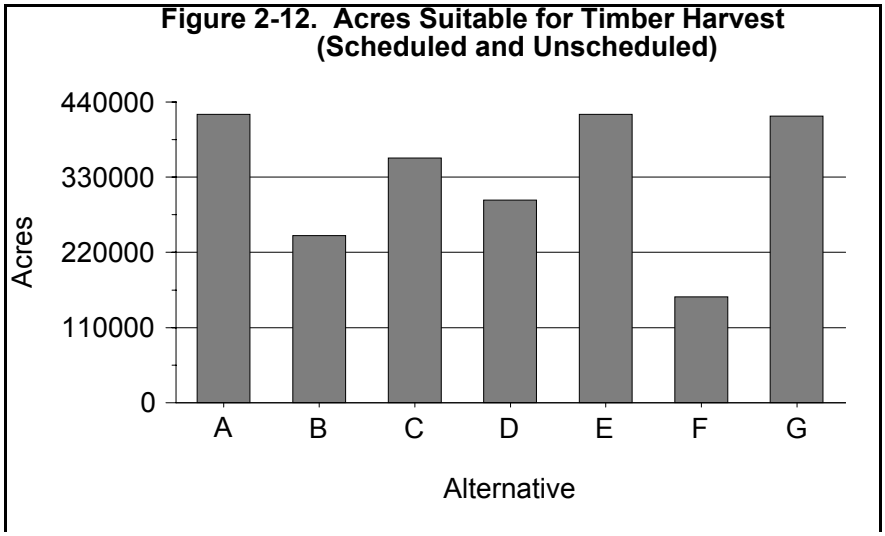
The stipulations developed in the oil and gas leasing analysis have been adjusted to reflect the standards in the Revised Plan for all alternatives except Alternative A. For Alternative A, acreages are left as identified in the Oil and Gas Leasing Analysis Environmental Impact Statement.

Timber Suitability/Allowable Sale Quantity

The identification of areas suitable and available for timber harvest is required in the forest planning process (36 CFR 219.14). The Allowable Sale Quantity (ASQ) is determined from the analysis of suitable timber lands. There is a high level of public interest in designation of land suitable for timber production and the resulting ASQ. With increased public scrutiny on below-cost timber sales, the financial efficiency of the timber program is also an issue.

Figure 2-12 displays the lands that are suitable, including scheduled and unscheduled, for timber production for each alternative. Alternatives A, E, and G have the largest amount of suitable timber lands.

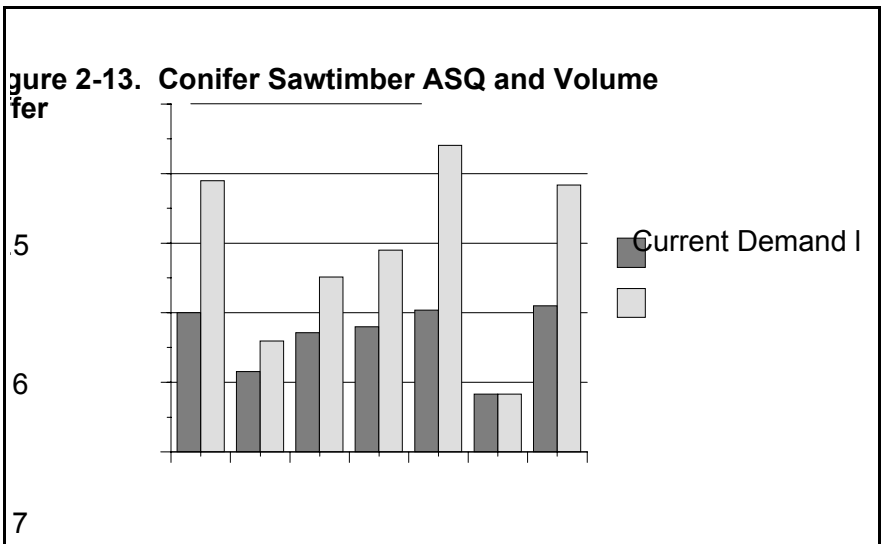
Figure 2-12. Acres Suitable for Timber Harvest (Scheduled and Unscheduled)



Source: Analysis Area Codes for Routt FORPLAN Model

Figure 2-13 displays the ASQ (full implementation level) and volume offer (constrained to experienced budget levels) for conifer sawtimber for decade 1 for each alternative. Also displayed is the current timber demand level of 29.5 MMBF. None of the alternatives meet the demand level, although Alternative E comes close. Alternative E provides the highest ASQ. Alternative G provides the highest volume offer.

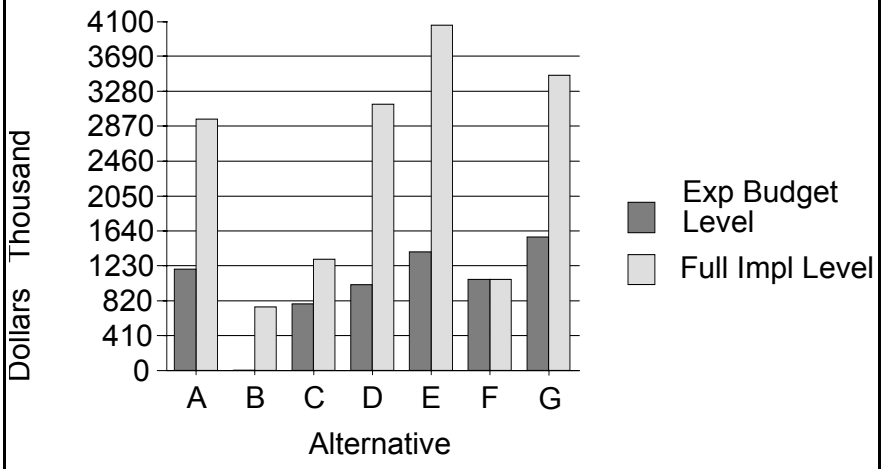
gure 2-13. Conifer Sawtimber ASQ and Volume fer



Source: Routt FORPLAN Model

Figure 2-14 displays the net returns for the timber program for decade 1 for each alternative. No alternative is below-cost. Alternative G generates the highest net returns.

Figure 2-14. Net Returns from the Timber Program



Note: includes all costs for conifer and aspen

Source: Routt FORPLAN Model

Social

There are many social changes occurring in the West. Population increases are expected in all counties in the area of influence. Social analysis is conducted to determine what effect the Forest's land management programs have on local communities and the people using the natural resources.

Communities such as Kremmling and Steamboat Springs will continue to grow due to influences outside the Revised Plan, including tourism and recreation growth. Walden, Saratoga, and Encampment's life-styles are more dependent on resources from the Forest. Alternatives A, C, D, E, and G provide opportunity to continue with similar life-styles in those communities.

Economic

Changes in Forest Service expenditures, the production of natural resources, and uses of the Forest have direct and indirect effects on local jobs and income. Tables 2-7 and 2-8 display the changes to jobs and changes to income from the base year of 1994. Total jobs and income will increase for all alternatives under either budget level. However, this increase is primarily due to an increase in recreation on the Forest.

At the experienced budget level, jobs and income related to timber, range, forest expenditures, and payments to counties will decline under all alternatives. The timber-related jobs and income show the greatest decrease and range-related jobs and income, the smallest. Alternatives F and B have the greatest loss to jobs and income from these activities. Alternatives A, E, and G have the least impact on jobs and income from these activities.

Under the desired condition level, timber-related jobs and income would increase under Alternatives A, E, and G and remain constant under Alternative D. Alternatives C, B, and F would generate a decline in timber-related jobs and income. Range-related jobs and income would remain constant or increase under all alternatives except F, where a slight decrease would occur.

Table 2-7. Changes to Employment - Increase or Decrease in Number of Jobs

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
Experienced Budget Level							
Recreation and Wildlife	+1,841	+1,962	+1,965	+1,950	+1,937	+1,777	+1,918
Timber	-63	-123	-84	-78	-61	-150	-56
Range	-3	-6	-5	-5	-3	-9	-3
Forest Service Expenditures	-14	-20	-17	-17	-13	-24	-12
Payments to Counties	-2	-4	-4	-3	-2	-9	-2
Total	+1,758	+1,809	+1,856	+1,846	+1,859	+1,586	+1,845
Desired Condition Level							
Recreation and Wildlife	+1,841	+1,963	+1,965	+1,950	+1,938	+1,777	+1,918
Timber	+74	-92	-24	0	+110	-150	+69
Range	+4	0	+1	+1	+4	-4	+4
Forest Service Expenditures	+76	+39	+54	+57	+92	+25	+89
Payments to Counties	+7	-4	+1	+9	+10	-8	+7
Total	+2,003	+1,906	+1,997	+2,017	+2,154	+1,640	+2,087

Source: IMPLAN impact analysis.

Table 2-8. Changes to Income - Increase or Decrease in Millions of Dollars (1996 dollars)

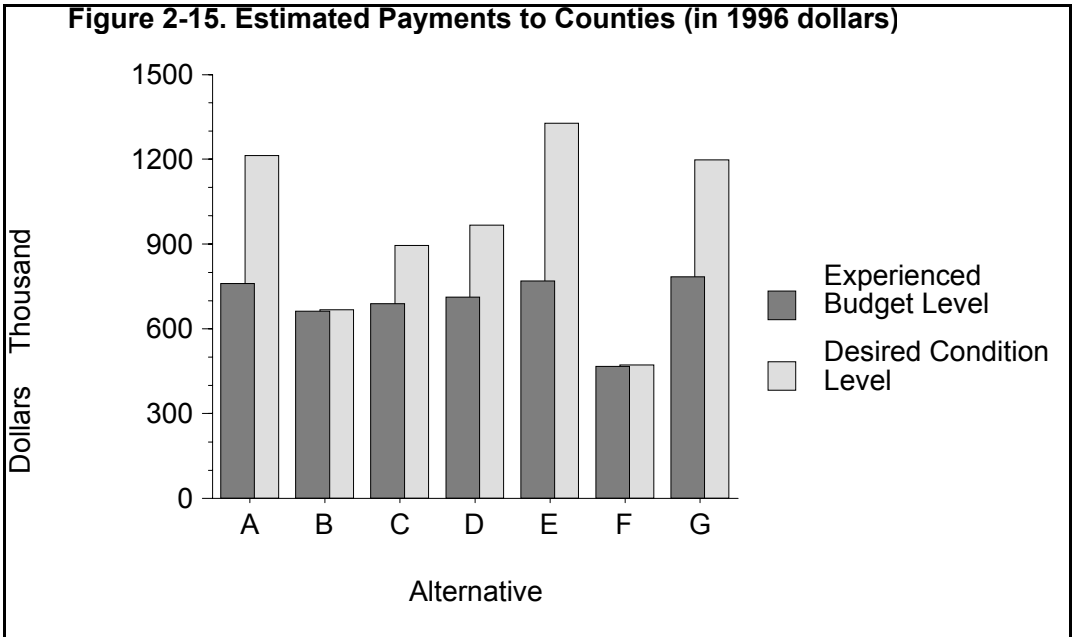
	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt G
Experienced Budget Level							
Recreation and Wildlife	+33.6	+35.6	+35.6	+35.4	+35.2	+32.6	+34.8
Timber	-1.3	-2.5	-1.7	-1.6	-1.2	-3.1	-1.1
Range	0	-0.1	-0.1	-0.1	0	-0.2	0
Forest Service Expenditures	-0.5	-0.8	-0.7	-0.7	-0.5	-0.9	-0.5

Payments to Counties	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	0
Total	+31.6	+32.1	+33.1	+32.9	+33.3	+28.3	+33.2
Desired Condition Level							
Recreation and Wildlife	+33.6	+35.6	+35.6	+35.4	+35.2	+32.6	+34.9
Timber	+1.5	-1.9	-0.5	0	+2.3	-3.1	+1.4
Range	+0.1	0	0	0	+0.1	-0.1	+0.1
Forest Service Expenditures	+3.0	+1.6	+2.1	+2.2	+3.6	+1.0	+3.5
Payments to Counties	+0.2	-0.1	0	+0.2	+0.3	-0.2	+0.2
Total	+38.4	+35.2	+37.3	+37.9	+41.4	+30.3	+40.0

Source: IMPLAN impact analysis.

Figure 2-15 displays the estimated 25% payments to counties. Actual payments will vary based on production levels and actual timber prices. Alternative F has the lowest level of returns and Alternatives G, E, and A have the highest.

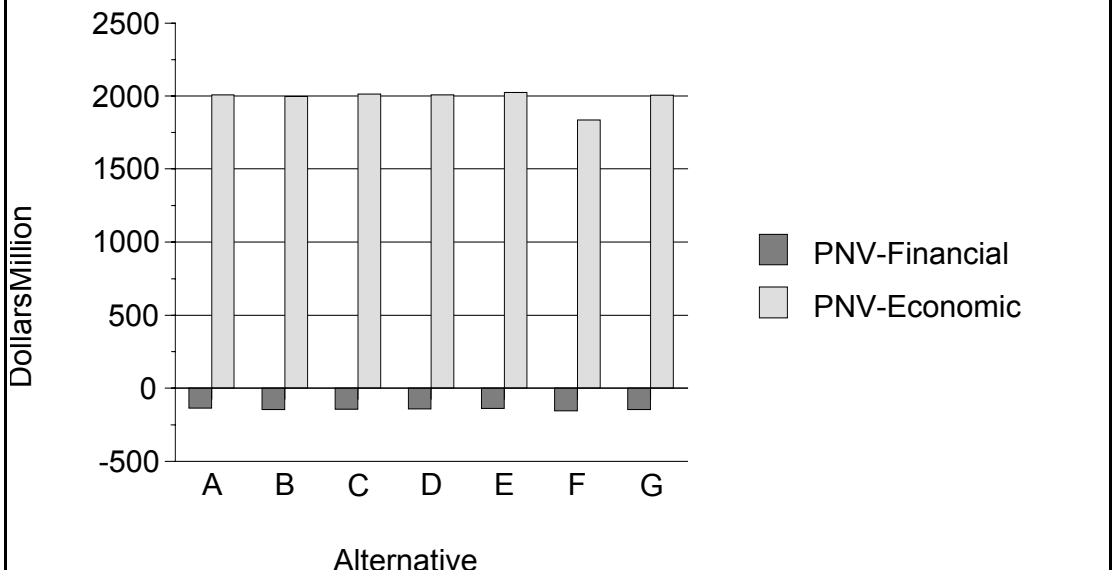
Figure 2-15. Estimated Payments to Counties (in 1996 dollars)



Source: Routt PNV Analysis

Figure 2-16 displays the financial and economic present net value for each alternative at the desired condition level. In all alternatives, costs exceed revenues. Only the timber program is above-cost. In all alternatives, economic values exceed costs, largely because of recreation.

Figure 2-16. Financial and Economic Present Net Value (Desired Condition Level)



Source: Routt PNV Analysis